$$V_{[flow]} = \bar{\dot{Q}} \cdot \Delta t$$

Eq. 1066.605-9

Example:

$$\bar{\dot{Q}}_{CVS} = 0.338 \text{ m}^3/\text{s}$$

$$\Delta t = 505 \text{ s}$$

$$V_{CVS} = 0.338 \cdot 505$$

$$V_{CVS} = 170.69 \text{ m}^3$$

§ 1066.610 Dilution air background correction.

(a) Correct the emissions in a gaseous sample for background using the following equation:

$$x_{[emission]} = x_{[emission]dexh} - x_{[emission]bkgnd} \cdot \left(1 - \left(\frac{1}{DF}\right)\right)$$

Eq. 1066.610-1

Where:

$x_{[emission]dexh}$ = measured emission concentration in dilute exhaust (after dry-to-wet correction, if applicable).

$x_{[emission]bkgnd}$ = measured emission concentration in the dilution air (after dry-to-wet correction, if applicable).

DF = dilution factor, as determined in paragraph (b) of this section.

Example:

$x_{NOxdexh}$ = 1.08305 ppm

$x_{NOxbkgnd}$ = 0.12456 ppm

DF = 9.14506

$$x_{NOx} = 1.08305 - 0.12456 \cdot \left(1 - \left(\frac{1}{9.14506}\right)\right) = 0.97211 \text{ ppm}$$

(b) Except as specified in paragraph (c) of this section, determine the dilution factor, *DF*, over the test interval using the following equation:

$$DF = \frac{1}{\left(1 + \frac{\alpha}{2} + 3.76 \cdot \left(1 + \frac{\alpha}{4} - \frac{\beta}{2}\right)\right) \cdot (x_{CO2} + x_{NMHC} + x_{CH4} + x_{CO})}$$

Eq. 1066.610-2

Where:

x_{CO2} = amount of CO_2 measured in the sample over the test interval.

x_{NMHC} = amount of C_1-equivalent NMHC measured in the sample over the test interval.

x_{CH4} = amount of CH_4 measured in the sample over the test interval.

x_{CO} = amount of CO measured in the sample over the test interval.

α = atomic hydrogen-to-carbon ratio of the test fuel. You may measure α or use default values from Table 1 of 40 CFR 1065.655.

β = atomic oxygen-to-carbon ratio of the test fuel. You may measure β or use default values from Table 1 of 40 CFR 1065.655.

Example:

x_{CO2} = 1.456 % = 0.01456

x_{NMHC} = 0.84 ppm = 0.00000084

x_{CH4} = 0.26 ppm = 0.00000026

x_{CO} = 80.4 ppm = 0.0000804

α = 1.92

β = 0.03

$$DF = \frac{1}{\left(1+\frac{1.92}{2}+3.76\cdot\left(1+\frac{1.92}{4}-\frac{0.03}{2}\right)\right)\cdot(0.01456+0.00000084+0.00000026+0.0000804)} = 9.14506$$

(c) Determine the dilution factor, DF, over the test interval for partial-flow dilution sample systems using the following equation:

$$DF = \frac{V_{dexhstd}}{V_{exhstd}}$$

Eq. 1066.610-3

Where:

$V_{dexhstd}$ = total dilute exhaust volume sampled over the test interval, corrected to standard reference conditions.

V_{exhstd} = total exhaust volume sampled from the vehicle, corrected to standard reference conditions.

Example:

$V_{dexhstd}$ = 170.9 m^3

V_{exhstd} = 15.9 m^3

$$DF = \frac{170.9}{15.4} = 11.1$$

(d) Determine the time-weighted dilution factor, DF_w, over the duty cycle using the following equation:

$$DF_w = \frac{\sum_{i=1}^{N} t_i}{\sum_{i=1}^{N} \frac{1}{DF_i} \cdot t_i}$$

Eq. 1066.610-4

Where:
N = number of test intervals.
i = test interval number
t = duration of the test interval.
DF = dilution factor over the test interval.
Example:

$$N = 3$$

$$DF_1 = 14.40$$

$$t_1 = 505 \text{ s}$$

$$DF_2 = 24.48$$

$$t_2 = 867 \text{ s}$$

$$DF_3 = 17.28$$

$$t_3 = 505 \text{ s}$$

$$DF_w = \frac{505 + 867 + 505}{\left(\frac{1}{14.40} \cdot 505\right) + \left(\frac{1}{24.48} \cdot 867\right) + \left(\frac{1}{17.28} \cdot 505\right)} = 18.82$$

§ 1066.615 NO_X intake-air humidity correction.

You may correct NO_X emissions for intake-air humidity as described in this section if the standard-setting part allows it. See § 1066.605(c)(1) for the proper sequence for applying the NO_X intake-air humidity correction.

(a) For vehicles at or below 14,000 pounds GVWR, apply a correction for vehicles with reciprocating engines operating over specific test cycles as follows:

(1) Calculate a humidity correction using a time-weighted mean value for ambient humidity over the test interval. Calculate absolute ambient humidity, H, using the following equation: